

I Claim:

1. A bone fixation assembly comprising:
  - (a) a fixation device having a through passage;
  - (b) a fastening screw having a threaded shaft for insertion through the  
5 through passage and threadable insertion into bone, and a head having substantially frustospherical shaped side surfaces;
  - (c) a bushing having;
    - (i) upper and lower surfaces;
    - (ii) a side wall with an exterior surface configured and  
10 dimensioned for axial rotation within said through passage of the fixation device and an interior surface which defines a socket bore that extends through the upper and lower surfaces and is configured and dimensioned for polyaxial rotation of said screw head therein; and
    - (iii) at least one slot located on the sidewall for allowing inward  
compression of said bore against said screw head; and
  - 15 (d) cam means disposed between said through passage and said bushing and configured and dimensioned for inwardly compressing said bushing upon axial rotation thereof in said through passage whereby said bore is compressed against said screw head for locking said screw at a desired attitude relative to said fixation device.

2. The bone fixation assembly of claim 1 wherein said bushing socket bore has a substantially frustospherical shape with a central longitudinal axis.

3. The bone fixation assembly of claim 2 wherein said socket bore extends through the central axis of said bushing and is perpendicular to the upper and lower surfaces.

5 4. The bone fixation assembly of claim 3 wherein one of said at least one slot is a slot extending fully through said side wall from the upper surface through the lower surface.

5. The bone fixation assembly of claim 4 wherein a bottom portion of said through passage has an inverted frustoconical seat and said exterior surface of said bushing has a mating inverted frustoconical base configured and dimensioned for seating in said seat, said seat and  
10 said base coaxial with said central axis, said cam means comprised of annularly spaced upwardly extending ramp cams on said upper surface of said bushing and inwardly extending overhangs on said through passage positioned above said upper surface and having downwardly facing cam following surfaces configured and dimensioned for engaging said ramp cams when said bushing is axially rotated in said through passage whereby said bushing is driven downwardly into said seat by  
15 said ramp cams to thereby inwardly compress said bushing bore against said screw head.

6. The bone fixation assembly of claim 5 wherein said cam means includes radially extending ramp cams on said exterior surface of said bushing dimensioned and configured for compressing said socket bore inwardly when said bushing is axially rotated in said through passage.

5 7. The bone fixation assembly of claim 6 wherein said cam means includes ridges on at least one of said cams.

8. The bone fixation assembly of claim 4 wherein a bottom portion of said through passage has an inverted frustoconical seat and said exterior surface of said bushing has a mating inverted frustoconical base configured and dimensioned for seating in said seat, said seat and  
10 said base coaxial with said central axis, said cam means comprised of a threaded engagement between said bottom portion of said through passage and said bushing base whereby when said bushing is rotated in said through passage said bushing is drawn into said seat and thereby inwardly compressed against said screw head.

9. The bone fixation assembly of claim 8 wherein said threaded engagement is  
15 configured with left hand threads.

10. The bone fixation assembly of claim 1 wherein said fixation device is a bone plate having a first screw receiving socket element at a distal end of said assembly and configured with a screw shank passage and a screw head seat for attachment to bone with the aid of a bone

fixation screw, an elongate arm extending proximally from said first socket element and having an elongate through slot therealong, a second screw receiving socket element including said through passage containing said bushing and said cam means and slidably received over said arm with said socket bore aligned over said slot for receiving the shank of a fixation screw therethrough for attachment to bone, said bushing seat including portions of said through slot whereby said second socket element is clamped to said arm when said bushing is pressed downwardly into said seat by said cam means.

11. A method for securing a bone plate having a through passage to bone, the method comprising the steps of:

10 inserting the shaft of a fastening screw having a head and a threaded shaft through a bushing located in the through passage of the bone plate;

threading the fastening screw into a bone; and

compressing the bushing inward against the head of the screw with cams actuated by rotating the bushing in the through passage whereby the screw is locked relative to the

15 bone plate.

12. The method of claim 11 wherein the step of compressing also includes compressing the bushing downwardly into a seat to clamp separate elements of said bone plate together.